

Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

2
EP 0 784 371 A1

(12)

EUROPEAN PATENT APPLICATION

published in accordance with Art. 158(3) EPC

(43) Date of publication:

16.07.1997 Bulletin 1997/29

(21) Application number: 96922214.0

(22) Date of filing: 03.07.1996

(51) Int. Cl.⁶: **H02K 41/03**

(86) International application number:

PCT/JP96/01842

(87) International publication number:

WO 97/02647 (23.01.1997 Gazette 1997/05)

(84) Designated Contracting States:
DE

(30) Priority: 03.07.1995 JP 166730/95

(71) Applicant: **FANUC LTD.**
Minamitsuru-gun, Yamanashi 401-05 (JP)

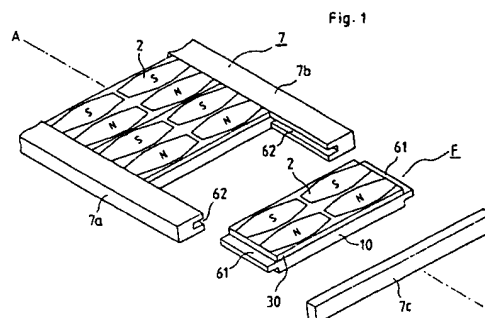
(72) Inventors:
• **SOGABE, Masatoyo**
Gotenba-shi, Shizuoka 412 (JP)

• **HIGASHI, Syougo,**
Fanuc Dai-3 Vira-karamatsu
Minamitsuru-gun, Yamanashi 401-05 (JP)

(74) Representative: **Billington, Lawrence Emlyn et al**
Haseltine Lake & Co.,
Imperial House,
15-19 Kingsway
London WC2B 6UD (GB)

(54) PERMANENT MAGNET FIELD POLE FOR LINEAR MOTORS

(57) A permanent magnet (2) whose upper surface has an S pole and a permanent magnet (2) whose upper surface has an N pole are arranged on a yoke plate (10) having a predetermined width and a predetermined length in the longitudinal direction of the yoke plate, thereby constituting one field pole unit F. Tenons (61) formed on the yoke plate (10) of the field pole unit F are engaged with tenon grooves (62) formed on both side portions (7a, 7b) of a frame member (7), so that a plurality of field pole units F are held by the frame member (7) in a manner such that the field pole units F are arranged in the longitudinal direction of the frame (7), thereby constituting a permanent magnet field pole for a linear motor.



EP 0 784 371 A1

with the frame member 7.

In place of the structure in which the plurality of field pole units F are engaged with the frame member 7, the following structure may be used. That is, as shown in Fig. 3, one or a plurality of dovetail grooves 81 and 82, extending in the longitudinal direction (direction perpendicular to the paper plane of Fig. 3), may be formed on a surface 8, on which a permanent magnet field pole is mounted, while the projections 91 and 92 to be engaged with the dovetail grooves may be formed on the surface of each field pole unit F, which confronts the mounting surface 8.

Claims

1. A permanent magnet field pole for a linear motor, comprising:

a plurality of field pole units, in each of which a plurality of permanent magnets are arranged and fixed on a yoke plate having a predetermined width and a predetermined length in the longitudinal direction of said yoke in a manner such that the polarities of adjacent permanent magnets differ from each other in the longitudinal direction of the yoke; and
a frame member for keeping said plurality of field pole units arranged in the longitudinal direction.

2. A permanent magnet field pole for a linear motor, wherein prepared are a plurality of first field pole units each of which comprise permanent magnets fixed in a line on a yoke plate, having a predetermined width and a predetermined length, with S pole on the surface, and a plurality of second field pole units each of which comprise permanent magnets fixed in a line on a yoke plate, having the same shape as that of the first field pole unit, with N pole on the surface, and

then, the first field pole units and the second field pole units are held by a frame member in a manner such that the first and second field pole units are alternately arranged in the longitudinal direction.

3. A permanent magnet field pole for a linear motor according to claim 1 or 2, wherein tenons projecting in the directions of the width are formed on both the side ends of said yoke plate, which constitutes said field pole unit, and tenon grooves each having a width engageable with the tenon are formed on the portions of said frame member corresponding to both the side ends of said yoke plate.

4. A permanent magnet field pole for a linear motor according to claim 1 or 2, wherein tenon grooves extending in the longitudinal direction of said yoke plate are formed on both the side ends of said yoke

plate, and tenons each having a thickness which can engage with the tenon groove are formed with portions of said frame member corresponding to both the side ends of said yoke plate.

5. A permanent magnet field pole for a linear motor according to claim 1, wherein said field pole unit is obtained by arranging an even number of permanent magnets on said yoke plate in the longitudinal direction of said yoke plate.

6. A permanent magnet field pole for a linear motor, comprising:

a plurality of field pole units, in each of which a plurality of permanent magnets are arranged and fixed on the upper surface of a yoke plate, having a predetermined width and a predetermined length, so that the magnetic poles of permanent magnets arranged adjacent to each other in the longitudinal direction of said yoke plate differ in polarity from each other, and one or two or more projections extending in the longitudinal direction are formed on the lower surface of said yoke plate; and
a field pole mounting surface with which dovetail grooves for engaging with the projections are formed.

Fig. 1

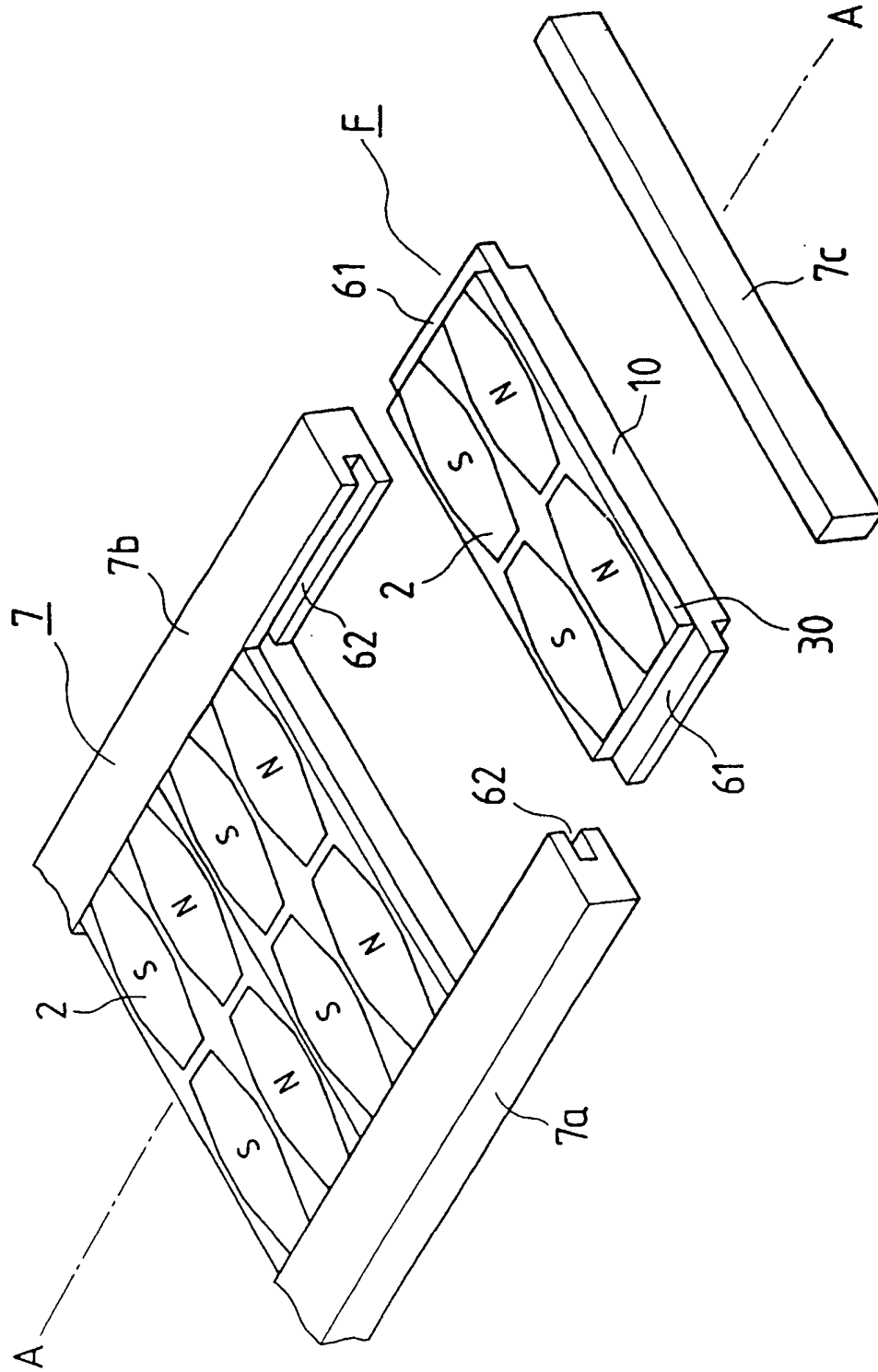


Fig. 2

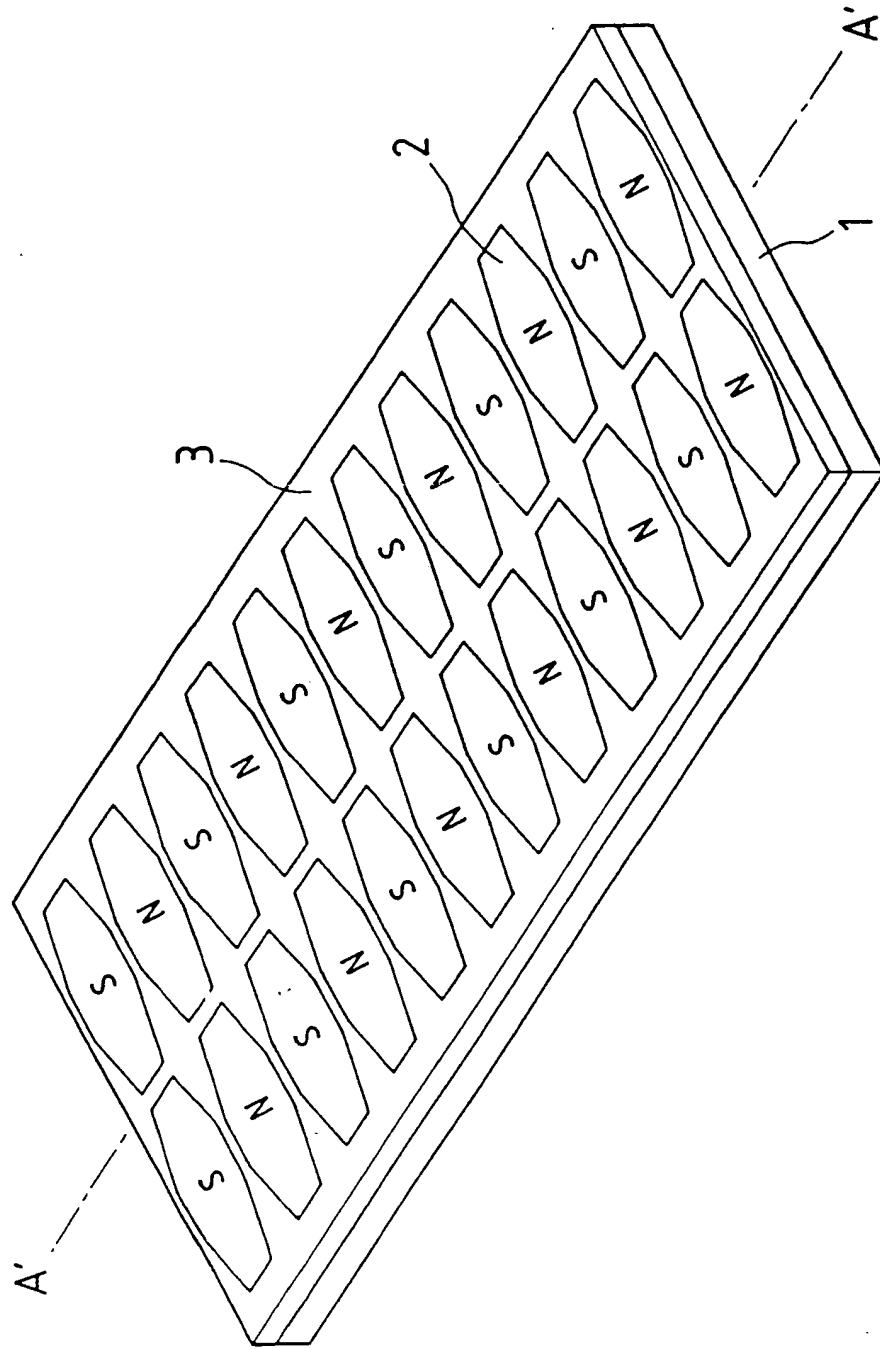
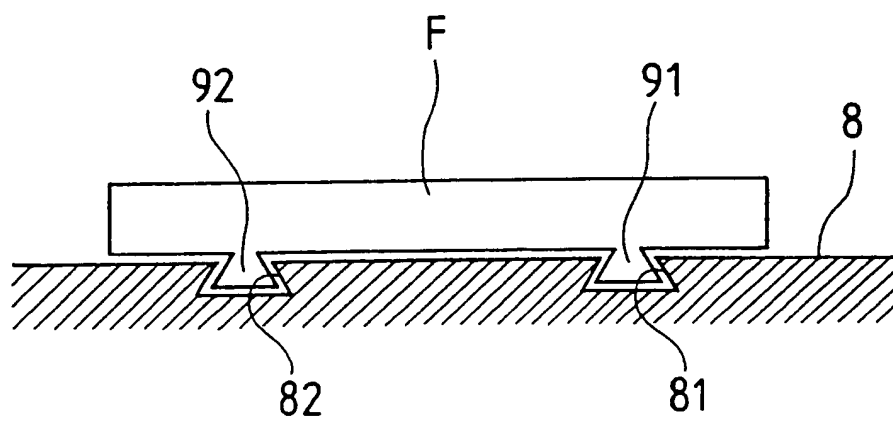


Fig. 3



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP96/01842

A. CLASSIFICATION OF SUBJECT MATTER Int. Cl ⁶ H02K41/03 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) Int. Cl ⁶ H02K41/00 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1951 - 1996 Kokai Jitsuyo Shinan Koho 1971 - 1996 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	JP, 8-186974, A (Fanuc Ltd.), July 16, 1996 (16. 07. 96)	1 - 6
Y	JP, 3-31367, U (Nissan Shatai Co., Ltd.), March 27, 1991 (27. 03. 91), Figs. 3, 5	1 - 6
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search September 5, 1996 (05. 09. 96)		Date of mailing of the international search report September 17, 1996 (17. 09. 96)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No		Authorized officer Telephone No